NOAA Awards Emergency Funds for Response to Massive Harmful Algal Bloom (HAB), or Red Tide Event in New England

Background on Red Tide Event

- The most severe bloom since 1972 of *Alexandrium fundyense* (a microscopic algae), also referred to as a red tide, has spread from Maine to Massachusetts, resulting in extensive commercial and recreational shellfish harvesting closures to protect humans from paralytic shellfish poisoning (PSP).
- The last major red tide in Massachusetts coastal waters was 12 years ago, although there have been sporadic localized problems. NOAA Harmful Algal Bloom (HAB) programs did not exist at the time of earlier events, so NOAA did not provide specific financial assistance during either event.
- State managers are concerned that the closures are projected to last for at least a month during the busiest time of the tourist season. *Alexandrium* blooms occur periodically in the Gulf of Maine, but rarely at the density and geographic extent now being witnessed. The abnormally large bloom could be due to unusual winds and precipitation during the past few weeks. Winds may have pushed the red tide down the coast and runoff may have fueled the outbreak by creating ideal conditions for growth.
- The organism produces potent neurotoxins that can accumulate in filter-feeding shellfish. Consumption of toxin-contaminated shellfish by humans can result in severe illness and death due to the PSP syndrome. States are responsible for rigorous shellfish monitoring programs to prevent outbreaks of PSP.

NOAA Action on Current Red Tide Event

- For the current bloom event along the Massachusetts and Gulf of Maine coastline, NOAA has provided emergency funding to pay external scientists for new and expanded sampling of the toxic algae in Massachusetts Bay through its Center for Coastal Ocean Science - Center for Sponsored Coastal Ocean Research's (CSCOR) Harmful Algal Bloom Event Response Program.
- NOAA has provided more than $30,000 to Woods Hole Oceanographic Institution for ship-based sampling efforts so that researchers could track the bloom and advise state agencies where to focus their sampling to protect human health. These funds will allow monitoring of the extent and movement of the bloom in order to provide managers with early warnings of shellfish toxicity to protect public health in the region.
- Initial funding of $16,300 was awarded on May 23, 2005 for a series of cruises to assess the extent of the bloom in Massachusetts coastal waters. Recent expansion of shellfish closures to Buzzards Bay, Nantucket Island, and Martha's Vineyard has raised the concern that the red tide could now move into southern New England and New York waters, resulting in additional shellfish closures.
- Supplemental funding amounts of $2,300 and $12,000 were approved on May 27, 2005 and June 8, 2005, respectively, to support cruises that continue to assess the spread of the bloom. Information about *Alexandrium* abundance is of great value to

state coastal managers because it allows them to focus their sampling efforts on new areas and decrease sampling efforts in areas that were already closed and which are surrounded by waters with very high *Alexandrium* concentrations.

- NOAA Fisheries Service is in frequent consultation with the US Food and Drug Administration (FDA) and the Commonwealth of Massachusetts which are monitoring the extent of the shellfish beds affected by red tide. Within the US Government, the FDA has the lead responsibility for determining the risks to human health in this situation.
- NOAA's Northeast Fishery Science Center (NEFSC) has not been formally involved in monitoring HAB occurrences in inshore waters of New England. However, during the current red tide event, NEFSC oceanographers have assisted state and academic researchers monitoring the outbreak with sampling and data collection used to understand where and how the event is spreading.

NOAA Red Tide Capabilities

- NOAA's National Centers for Coastal Ocean Science (NCCOS) has supported a large, interdisciplinary harmful algal bloom research program since 1997, conducted by internal and external scientists.
- NOAA's CSCOR's Ecology and Oceanography of Harmful Algal Blooms (ECOHAB) and Monitoring and Event Response to Harmful Algal Blooms (MERHAB) research on the red tide organism from the Gulf of Maine – encompassing $11 million from 1998 through 2007 - has greatly enhanced response capabilities in the region.
- New molecular methods for rapidly detecting and mapping the red tide organism are being used to track the bloom in almost real time. These data, combined with oceanographic and meteorological data from ships and moorings, are being utilized in recently developed, coupled biological and physical models to forecast the spread of the red tide and to understand the factors leading to this unusual event.
- This integration of ocean observing system data with models during this red tide event is an example of the predictive, regional, ecosystem-based research being conducted at NOAA to assist managers and the public in understanding and responding to coastal ocean issues.
- NEFSC has expertise and experience at both the Milford, Connecticut and Sandy Hook, New Jersey Labs for monitoring and investigating HAB events such as red and brown tides, understanding their health effects on sea life, and bioaccumulation in predator species.
- NEFSC's Sandy Hook, NJ Lab has a standing protocol and staff tasked to respond to fish kills in New Jersey coastal waters. The Lab leads an informal communication and coordination network with other regional agencies studying these kills and routinely samples fish kill sites for phytoplankton presence as well as other variables.
- NEFSC's Milford, CT Laboratory has assessed HAB outbreaks in hatchery operations and assisted with containment strategies. The Lab staff has recently produced important information on HAB cyst viability after bivalve ingestion. This work has included the "red tide" organism.

- NEFSC's Narragansett lab uses NOAA's high resolution satellite data to monitor sea-surface temperature (SST), and remotely-sensed SeaWiFS data from NASA, to monitor phytoplankton chlorophyll levels and primary production throughout the northeast continental shelf. The lab has constructed and maintains an ongoing multiyear SST and chlorophyll time-series for analyses of oceanographic variability. The remotely-sensed information can be used to establish the spatial extent of phytoplankton blooms occurring throughout the Northeast Shelf ecosystem.
- NOAA R/V *Delaware II* (homeported at the NEFSC in Woods Hole, MA) is currently conducting the surfclam/ocean quahog survey, and could possibly be used to sample these, and potentially other, offshore bivalves.
- The NOAA Seafood Inspection Program provides Paralytic Shellfish Poison (PSP) testing for commercial harvesters for a fee through its Analytical Laboratory Services (ALS).
- Oceanographic and meterological data from the Gulf of Maine Ocean Observing System (GOMOOS) moorings and a US Geological Survey (USGS) mooring in Massachusetts Bay were used in coupled biophysical models, developed with earlier NOAA ECOHAB and MERHAB funding, to predict the path of the bloom. These newly developed models supported by observing systems and combined with new real time methods of detecting the red tide, allowed state public health and resource managers to focus their sampling in areas where toxicity was likely to increase in shellfish.
- Oceanographic and meterological data from observing systems like GOMOOS are critically needed for use in models that are being developed to forecast the occurrence and movement of Harmful Algal Blooms (HABs), such as the red tide in the Gulf of Maine and along the Massachusetts coast. These observing systems will be even more valuable for monitoring HABs and providing early warning of toxic outbreaks when sensors for HAB cells or their toxins, currently in development, are incorporated.
- This is also an excellent example of the need for new sensors for observation platforms that can provide the data need to differentiate what specific types of HABs/organisms are associated with these bloom events so appropriate mitigation and control measures can be taken promptly.

Partner Organizations

- Organizations involved in the emergency response to this red tide event include the Woods Hole Oceanographic Institute (WHOI), Massachusetts Division of Marine Fisheries, Massachusetts Water Resources Authority (MWRA), University of Massachusetts - Dartmouth Center for Coastal Studies in Provincetown.
- At times, four research vessels supported and staffed by WHOI and these groups have been in the water simultaneously sampling this bloom. Ancillary data from moorings was provided by the Gulf of Maine Ocean Observing System and the U.S. Geological Survey's Woods Hole instrumented mooring near the MWRA outfall.
- NOAA Fisheries Service has been consulting daily with the FDA and the Commonwealth Massachusetts regarding the possibility of closing some Federal waters to the harvest of bivalve mollusks. We are expecting a recommendation from

the FDA to make such a closure. We may receive the formal recommendation as early as today (June 9, 2005). In preparation for this recommendation, we are discussing internally how to accomplish this closure expeditiously and in a manner that will protect human health while still ensuring that commercial harvesters are not affected more than necessary. At issue are: a) a mechanism for determining when the closure is no longer needed, and b) understanding the impact of an emergency closure on the human environment, including an analysis of the economic consequences of the action. We expect to initiate the action under the Magnuson Stevens Act, which allows one 180 day emergency closure for human health reasons, with the possibility of one 180 day extension of that closure. This action will require a NEPA analysis. **NOTE: Discussions on a possible request from FDA must remain internal until an official request is made from FDA. This can not be discussed with Congress or the State of Massachusetts.**

- NOAA Fisheries Service currently has a fishery management plan in place for ocean quahog, surf clams and Atlantic sea scallops. There may be other species affected by the red tide, including whelks and mussels that occur in Federal waters but are not covered by existing management measures.

Outreach

- NOAA has assisted the FDA in providing outreach to inform the affected public of the situation by issuing an alert on NOAA Weather Radio, which reaches most fishermen. NOAA has informed FDA that we are ready to assist with other outreach methods including mailing notices to permit holders and using our extensive outreach email address list to get the word out, but so far the FDA has not requested these service.

Disaster Assistance

- NOAA has been preparing for a possible request from the States that the fisheries affected by the red tide be declared a "commercial fishing failure" as allowed under Section 1861a of the MSA. Please see attached information on disaster assistance.